Inventor: Sines
Serial No.

PATENT APPLICATION
Navy Case No. 78,465

WHAT IS CLAIMED IS:

1. A apparatus for cooling electrical devices having layers of electrically conductive material comprised of:

one or more thermally conductive strips placed between preselected layers of the electrically conductive material along the axis and perpendicular to the turns, said conductive strip conducting heat, generated by an electrical current flowing in the conductive material, to a first and second end of the conductive strip extending outside of the area covered by the conducting material; and

means for conducting the heat from the conductive strip to a base-plate heat sink to ambient atmosphere.

2. A apparatus, as in Claim 1, wherein the thermally conductive strip is a high modulus carbon graphite laminate material.

3. A apparatus, as in Claim 1, wherein the thermally conductive strip is copper.

4. A apparatus, as in Claim 1, wherein the thermally conductive strip is a ceramic.

5. A apparatus, as in Claim 1, wherein the means for conducting the heat from the conductive strip to a base-plate heat sink to

ambient atmosphere is a thermally conducting potting compound to conduct the heat to a base-plate heat sink for radiation into the ambient atmosphere.

6. A apparatus, as in Claim 1, wherein the means for conducting the heat from the conductive strip to a base-plate heat sink to ambient atmosphere is a fan.

7. A power transformer comprised of:

a core around which a plurality of layers of an electrically conductive material are wrapped;

one or more thermally conductive strips placed between preselected layers of the electrically conductive material along the axis and perpendicular to the turns, said conductive strip conducting heat, generated by an electrical current flowing in the conductive material, to a first and second end of the conductive strip extending outside of the area covered by the conducting material; and

means for conducting the heat from the conductive strip to a base-plate heat sink to ambient atmosphere.

8. A transformer, as in Claim 7, further comprised of:

said core having a plurality of lamination of core material; and

one or more thermally conductive strips placed between

preselected lamination of the core, said conductive strip conducting heat generated by an electrical field flowing in the lamination of the core to a first and second end of the conductive strip extending outside of the core.

9. A transformer, as in Claim 7. wherein the electrically conductive material is copper wire coated with a fluorocarbon resin.

10. A power transformer comprised of:

a core around which a plurality of layers of an electrically conductive material are wrapped;

one or more thermally conductive strips placed between preselected layers of the electrically conductive material along the axis and perpendicular to the turns, said conductive strip conducting heat, generated by an electrical current flowing in the conductive material, to a first and second end of the conductive strip extending outside of the area covered by the conducting material;

means for conducting the heat from the conductive strip to a base-plate heat sink to ambient atmosphere;

said transformer having an upper and lower outer surface;

a thermocooler attached to the upper and lower outer surfaces of said transformer to conduct heat from these surfaces to a base plate; and

means for controlling the operational cycle of the thermocooler.

11. A power transformer comprised of:

a core around which a plurality of layers of an electrically conductive material are wrapped;

one or more thermally conductive strips placed between preselected layers of the electrically conductive material along the axis and perpendicular to the turns, said conductive strip conducting heat, generated by an electrical current flowing in the conductive material, to a first and second end of the conductive strip extending outside of the area covered by the conducting material;

said core having a plurality of lamination of core material;

one or more thermally conductive strips placed between preselected lamination of the core, said conductive strip conducting heat generated by an electrical field flowing in the lamination of the core to a first and second end of the conductive strip extending outside of the core; and

means for conducting the heat from the conductive strip and lamination to a base-plate heat sink to ambient atmosphere.

12. A power transformer comprised of:

a core around which a plurality of layers of an electrically conductive material are wrapped;

one or more thermally conductive strips of high modulus

carbon laminate material placed between preselected layers of the electrically conductive material along the axis and perpendicular to the turns, said conductive strip conducting heat, generated by an electrical current flowing in the conductive material, to a first and second end of the conductive strip extending outside of the area covered by the conducting material;

said core having a plurality of lamination of core material;

one or more thermally conductive strips of high modulus carbon laminate material placed between preselected lamination of the core, said conductive strip conducting heat generated by an electrical field flowing in the lamination of the core to a first and second end of the conductive strip extending outside of the core; and

a potting compound for conducting the heat from the conductive strip and lamination to a base-plate heat sink to ambient atmosphere.

Sub B1

13. A electric motor comprised of:

one or more laminations forming the electric motor;

one or more circular thermally conductive disks placed between preselected layers of the motor laminations along the axis and perpendicular to the turns, said conductive disk conducting heat, generated by an electrical current flowing within the motor, to an edge of the conductive disk outside of the area covered by the motor laminations; and

means for conducting the heat at the end of the conductive disk to ambient atmosphere.

14. A method for cooling electrical devices having layers of electrically conductive material comprised of the following steps:

placing a thermally conductive material capable of conducting heat from between preselected layers of the electrically conductive material to a first and second end of the thermally conductive material extending outside of the area covered by the conducting material; and

conducting the heat from the first and second ends of the thermally conductive material to ambient atmosphere.

15. A method, as in Claim 14, further comprised of placing a thermally conductive material having a first and second end between lamination of a core forming the transformer, said first and second ends of the thermally conductive material extending outside of the core.